

AMENDMENTS TO THE SPECIFICATION

Please amend the specification as indicated hereafter. It is believed that the following amendments and additions add no new matter to the present application.

In the Title:

Please replace the title with the following new title:

SYSTEM AND METHOD FOR A TROUBLESHOOTING PORTAL TO ALLOW TEMPORARY MANAGEMENT ACCESS TO A COMMUNICATION DEVICE

In the Specification: [Use ~~strikethrough~~ for deleted matter (or double square brackets “[[[]]]” if the ~~strikethrough~~ is not easily perceivable, *i.e.*, “4” or a punctuation mark) and underlined for added matter.]

Please amend the paragraph starting on p. 2, line 20 as follows:

FIG. 1 illustrates a communication environment 22 having an access provider network 24 and a network service provider (NSP) network 26. Typically, communication environment 22 would have a plurality of networks (not shown) interconnected together via communication links as described hereinafter. An example of a network is the public switched telephone network (PSTN) or a public data network (PDN). Access to the network is provided by an access provider. These access providers generally provide the communication and switching facilities over which the above-mentioned communication devices operate. Because of the evolution of the communication system from a plain old telephony system (POTS), originally designed to handle analog voice communications, to today's communication network capable of operating over a variety of physical connection systems using a variety of communication formats, the communication system employed today which provides both analog POTS voice capability and digital data capability is quite complex. Often, special interface devices are needed to provide connectivity between the different types of communication hardware and information formats. For example, a user of a digital data system for accessing the Internet may be employing an entirely different technology than the communication system employed by access provider network 24 which may be employing an ATM based communication network.

Please amend the paragraph starting on p. 4, line 1 as follows:

FIG. 1 shows a simplified illustrative communication environment 22 in which a plurality of user devices 28 and 30 reside. Each user device 28 and 30, ~~are~~ is connected to a communication device 32 and 34, respectively, such as a frame relay or ATM access unit, via connections 36 and 38, respectively. User devices 28 and 30 are typically customer premises equipment, such as routers or the like, which may be connected to a local area network (LAN) or the like and residing off the access provider network 24. One skilled in the art will realize that the above-described communication devices and user devices may be of any of a wide variety of devices commonly employed in the industry.

Please amend the paragraph starting on p. 4, line 9 as follows:

For simplicity and as an example, only two communication devices 32 and 34, are depicted in FIG. 1. In practice, a communication environment 22 will contain many communication devices. Communication devices 32 and 34 are commonly considered communication endpoints and communicate with each other over an access provider network 24, in a conventional manner. The term communication device and endpoint are intended to be equivalent and are used interchangeably hereinafter. Access provider network 24 can be, for example, any network that provides connectivity for communication devices 32 and 34, and in the simplified illustrative example of FIG. 1, the portion of the access provider network shown is an ATM communication network. Access provider network 24 illustratively connects to communication devices 32 and 34 over connections 40 and 42, respectively. Connections 40 and 42 can be physical links and can be, for example but not limited to, T1/E1 service, ~~digital subscribe~~digital subscriber line or loop (DSL), or any digital data service (DDS).

Please amend the paragraph starting on p. 4, line 22 as follows:

Access provider network 24 and NSP network 26 are typically characterized by a mesh network of links interconnecting a matrix of intermediate nodes (not shown) through switches, such as switches (S) 46, 48, 50, 52, 54 and 56, which are well known in the art. Communication links provide the physical connections between switches. For example, link 58 connects switches 46 and 48. Other links 60,

some of which are shown as dotted lines for illustrative purposes, provide physical connections between other switches. For simplicity and as an example, only a limited number of switches and links are illustrated herein; however, access provider network 24 and NSP network 26 will typically contain many switching devices and links.

Please amend the paragraph starting on p. 5, line 1 as follows:

An operations center (OC) 62 is shown residing in access provider network 24. Within the OC 62 resides some of the control facilities necessary to maintain and operate the access provider network 24. As an illustrative example, a computer terminal 64 is shown residing in the OC 62. Computer terminal 64 interfaces with access unit (AU) 68 via connection 70 to provide an access provider operator management access to the various components of the access provider network 24. For further illustrative purposes, access unit 68 in OC 62 is shown connected to switch 52 via link 72 and connected to switch 48 over link 74. Additional links 60 may be used to connect to other switches throughout the access provider network 24 as necessary for the maintenance and operation of the access provider network 24. One skilled in the art will appreciate that an OC 62 will likely contain many computer terminals, switches and links which are not shown in the simplified illustrative example of FIG.

1.

Please amend the paragraph starting on p. 6, line 26 as follows:

Alternatively, the owner of user device 28 may have contracted with a network service provider who is not the access provider. As shown in the simplified communication environment 22 of FIG. 1, the contracted network services may have to be provided from NSP network 26 through access provider network 24. In this situation, an NSP operator working from OC 78 may have to access communication device 32. The NSP operator would first have to contact the access provider operator working in OC 62, via communications path 94, with a request to establish connectivity between switch 50 and communication device 28. Here, a communications path 94 is shown connecting OC 78 with OC 62. Communications path Connection 94 could be a POTS telephone line, a microwave channel, a satellite link, a radio channel or other commonly employed communication means. Then, VC 92 is established from switch 82 residing in OC 78 to the communication device 32.

In this illustrative example, the VC [[93]] 92 would be established over links 86, 88, 58 and 40. VC 92 may be either a PVC or an SVC depending upon a variety of factors, such as the nature of the agreement between the NSP and the access provider.

Please amend the paragraph starting on p. 8, line 15 as follows:

The present invention provides a system and method which utilizes a troubleshooting portal to instruct a switch in a communication system to provide a connection between a first communication device residing in an access provider network and a second communication device residing in a network service provider (NSP) network. An NSP operator establishes a session with the troubleshooting portal, typically residing in an access provider's network. The troubleshooting portal verifies that the NSP operator is authorized to have access to the requested communication device. After authorization is verified, one embodiment of the troubleshooting portal routes management traffic between the NSP operator and a digital subscriber loop (or digital subscriber line) access multiplexer (DSLAM) or similar switching device which uses a single VC from the access provider operation center to the DSLAM or switching device. The DSLAM or switching device then routes the management traffic to the desired communication device. Another embodiment of the troubleshooting portal instructs a switch to couple a virtual circuit (VC) defining a connection between the NSP operator and a predefined switch residing in the access provider system with a predefined VC defining a path between the predefined switch and the requested communication device. Additionally, the NSP operator may specify an internet protocol (IP) address to be associated with the requested endpoint. Once the troubleshooting portal has enabled connectivity between the NSP operator and the requested communication device, the NSP operator can conduct the necessary troubleshooting tests and other service functions via the portal connection as required by the contract arrangement between the NSP and the owner of the communication device.

Please amend the paragraph starting on p. 13, line 16 as follows:

FIG. 2 shows an illustrative example of a communication environment 22 in which a troubleshooting portal (P) 100 may reside. Elements in FIG. 2 that are similar to those in FIG. 1 bear the same reference numerals. Such elements having the same

reference numerals in FIGs. 1 and 2 may be considered to be like elements, however, since these like numeraled elements are incidental to the operation of the troubleshooting portal 100 which utilizes existing portions of communication network 22, one skilled in the art will realize that elements in FIGs. 1 and 2 need not be identical, as any variations of such elements will not adversely affect the functioning and performance of the troubleshooting portal 100.

Please amend the paragraph starting on p. 22, line 10 as follows:

FIG. 5 is a simplified illustrative example of an alternative embodiment of the troubleshooting portal 100 which provides access to a plurality of NSP networks. Troubleshooting portal [[252]] 100 is shown as connected to and in communication with access unit 262. For example, an NSP operator working from NSP network A 260 may access communication device 254 from computer terminal 256 by establishing a session with troubleshooting portal 100. Connectivity between NSP network A 260 and access provider network 264 is shown by VC 266, which corresponds to the physical link 268. Once the NSP operator has established a session with troubleshooting portal 100, the operator specifies an identifier to the troubleshooting portal 100 which is associated with communication device 254. Then, one embodiment of troubleshooting portal 100 would instruct access unit 262 to couple VC 266 with the predefined VC 270 as specified in the address table residing in troubleshooting portal 100. An alternative embodiment of troubleshooting portal 100 would instruct access unit 262 to route management traffic over VC 266 and VC 270.

Please amend the paragraph starting on p. 22, line 24 as follows:

Similarly, an NSP operator working from computer terminal 272 residing in NSP network B 274, may establish connectivity with communication device 276 by establishing a session with troubleshooting portal 100 and then specifying an identifier associated with communication device 276. One embodiment of troubleshooting portal 100 ~~have~~ has access unit 262 couple VC 278 with VC 280. An alternative embodiment of troubleshooting portal 100 would instruct access unit 262 to route management traffic over VC 278 and VC 280.

Please amend the paragraph starting on p. 24, line 27 as follows:

At step 310, the user responds by specifying to the troubleshooting portal 100 an end point or an equivalent identifier corresponding to the communication device for which access is desired. At step 312, the troubleshooting portal provides mapping of the endpoint to the switch port to which the endpoint is connected. As previously described, alternative embodiments of a troubleshooting portal 100 having security features may verify that the user is authorized to have access to the requested end point or communication device (steps not shown). If the user does not have authorized access, then the session may terminate or further provide an opportunity for the user to provide the necessary certification.

Please amend the paragraph starting on p. 25, line 29 as follows:

FIG. 7 is a block diagram illustrating a preferred embodiment of troubleshooting portal 100. The embodiment of troubleshooting portal 100 illustrated in FIG. 7 contains interface circuitry 342, communication bus 344, a processor 346, a device configuration module 352, timing circuitry 358 and a memory 350. The memory 350 has at least an address table 354, a signed IP address location 356 and security functions 348. Timing circuitry 358 includes clock 360.

Please amend the paragraph starting on p. 26, line 4 as follows:

Interface circuitry 342 interfaces with a communication system, such as but not limited to, a local area network (LAN) or Ethernet network or wide area network (WAN). Sessions with troubleshooting portal 100 can be established over this communication system [[304]] 344 by an NSP operator (not shown) and/or an access provider operator (not shown). Also, communication system [[304]] 344 provides connectivity to the access unit (not shown) which establishes connectivity to the requested endpoints as previously described (see FIGs. 2, 4 and 6). One skilled in the art will realize that communication system [[304]] 344, as illustrated in FIG. 7, is only one of a variety of ways in which troubleshooting portal 100, operators, and components of the communication network may be in communication with each other. Any variety of communication schemes could be employed without effecting the functionality of troubleshooting portal 100. For example, the troubleshooting portal 100 may host routing functionality normally provided by other communications

devices within communication system [[304]] 344. The utilization of such alternative communication schemes with a troubleshooting portal 100 is intended to be within the scope of this disclosure and the claims for a troubleshooting portal 100.

Please amend the paragraph starting on p. 29, line 1 as follows:

Another alternative embodiment of a troubleshooting portal 100 (FIG. 2) may be implemented using IP proxy. This alternative would be particularly advantageous in environments where limited IP addresses are available. Here a single IP address is assigned to the switch 450 50. The switch 450 50 acts as a proxy agent for all end points connected to the switch 450 50. Although end points still have IP addresses, the switch 450 50 now allows the assignment of non-unique IP addresses to the end points. This proxy agent embodiment of a troubleshooting portal which utilizes repeatable IP addresses is known in the art as a globally unique locally scoped (GULS) addressable end point system.

AMENDMENTS TO THE DRAWINGS

In the Drawings:

Please replace drawing sheets 1, 2, 4, 5 and 7 (showing Figs. 1, 2, 4, 5 and 7) with the newly-submitted figures attached herewith on separate sheets.

The following are the changes and/or corrections made to the drawings:

Figs. 1, 2, 4, 5 and 7 have been amended to show the required legends.